WHAT IS CLAIMED IS:

1. A method of 3-dimensional (3D) object reconstruction from a video sequence of two-dimensional (2D) images using a generic object model, including the steps of:

establishing a processing system;

producing a video sequence of 2D images of said object;

introducing in said processing system said video sequence of the 2D images of said object;

generating a 3D estimate defining an intermediate computer generated model of said object;

evaluating distortion level of said 3D estimate to obtain data on errors contained in said 3D estimate;

optimizing said 3D estimate by:

(a) introducing in said processing system a generic object model,

(b) smoothing said 3D estimate by correcting the same for said errors contained therein by comparing said 3D estimate with said generic object model, and

(c) generating a final 3D computer generated object model.

2. The method of Claim 1, where the step of evaluating distortion levels includes the step of:

applying statistical error characterization to said 3D estimate, said data on the errors being indicative of first regions in said 3D estimate containing local distortion.

3. The method of Claim 1, where the step of smoothing said 3D estimate includes:

applying a correcting energy minimization function thereto, said function comparing second regions of said 3D estimate containing depth discontinuities with corresponding regions of said generic object model, and

correcting said second regions of said 3D estimate.

4. The method of Claim 1, where said optimizing said 3D estimate includes the step of:

applying Markov Chain Monte Carlo sampling techniques thereto.

5. The method of Claim 1, where the step of generating said 3D estimate includes the step of:

applying Structure from Motion (SfM) techniques directly to said video sequence.

6. The method of Claim 1, wherein said 3D estimate includes a plurality of multi-frame intermediate reconstructions, each said multi-frame intermediate reconstruction corresponding to a respective pair of consequtive images of said video sequence.

7. The method of Claim 1, where the step of generating said 3D estimate includes the steps:

obtaining a plurality of multi-frame intermediate reconstructions, and

fusing said multi-frame intermediate reconstructions together after evaluating the error covariance of each.

8. The method of Claim 7, where the step of evaluating the error covariance includes the step of:

computing an optical flow of a corresponding image of said video images sequence of the object, and

analytically estimating the statistical error covariance from said optical flow.

9. The method of Claim 7, where the step of fusing includes the step of:

monitoring the progress of said fusion to determine the number of said multi-frame intermediate reconstructions required to achieve a tolerable level of distortion of a fused said 3D estimate to be compared with said generic object model.

10. The method of Claim 9, wherein said monitoring is based on a rate-distortion function.

11. The method of Claim 3, where the step of smoothing said 3D estimate includes the steps of:

aligning said 3D estimate with said generic object model,

identifying boundaries of said second regions containing depth discontinuities, and

smoothing said second regions enveloped by said boundaries.

12. The method of Claim 1, further comprising the step of:

after said step (b), mapping a texture onto the smoothed 3D model of the object.

13. The method of Claim 7, where the step of fusion includes the step of applying stochastic recursive approximation technique to each multi-frame intermediate reconstruction.